UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/897,910	07/03/2001	Richard Stirling-Gallacher	282651US8X	1395

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EXAMINER
DEAN, RAYMOND S

ART UNIT	PAPER NUMBER
2618	

NOTIFICATION DATE	DELIVERY MODE
04/08/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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	Application No.	Applicant(s)
Office Action Summary	09/897,910	STIRLING-GALLACHER ET AL.
	Examiner	Art Unit	
	RAYMOND S. DEAN	2618	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>15 January 2008</u>.

2a)☒ This action is **FINAL**.　　2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>23-34</u> is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>23-34</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>03 July 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　a)☒ All　b)☐ Some * c)☐ None of:

　　1.☒ Certified copies of the priority documents have been received.

　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail. _____.
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

DETAILED ACTION

Response to Arguments

1.   Applicant's arguments filed January 15, 2008 have been fully considered but they are not persuasive.

        Examiner has made a second examination of the Li reference and has determined that Li does teach channel estimation for data symbols between pilot symbols. The pilot symbols are inserted into each data packet, which comprises data symbols (See Abstract of Li) thus rendering a scenario of data symbols between pilot symbols. Li further teaches channel estimation for an estimated demodulated signal, which comprises pilot and data symbols (See Col. 6 lines 1 – 6). Since there are data symbols between pilot symbols and channel estimation for an estimated demodulated signal, which comprises pilot symbols and data symbols Li thus teaches channel estimation for data symbols between pilot symbols.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 23 – 25, 27 – 29, 31 – 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li (US 6,654,429) in view of Khayrallah et al. (6,047,171).

Regarding Claim 23, Li teaches a device for receiving signals in a wireless cellular orthogonal frequency division multiplex (OFDM) system, in which data symbols are transmitted in frequency subcarriers and timeslots (Figure 2, Col. 3 lines 30 – 39), comprising: a channel estimator configured to perform a channel estimation on the basis of received pilot symbols (Cols. 4 lines 35 – 67, 5 lines 1 – 21); and a filter configured to perform a channel estimation for data symbols between pilot symbols (Cols. 4 lines 35 – 67, 5 lines 1 – 21), an estimated carrier being a wanted carrier power value at a frequency subcarrier and a timeslot of a data symbol to be channel estimated, and said interference value is an interference reference value (Cols. 4 lines 35 – 67, 5 lines 1 – 21, typical OFDM systems comprise timeslots, channel estimation takes into account various characteristics of a channel such as adjacent and co-channel interference, along with noise and background effects, the effects of said interference is quantized using the carrier to interference ratio (CIR) thus channel estimation takes into account the CIR).

Li does not teach said filter being selected from a set of filters based on the estimated carrier to interference ratio.

Khayrallah teaches said filter being selected from a set of filters based on the estimated carrier to interference ratio (Col. 7 lines 9 – 31).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the filtering method of Khayrallah in the system of Li for the purpose of enabling optimum performance of the despite the effects of adjacent channel interference.

Regarding Claim 27, Li teaches a method for channel estimation in a wireless cellular orthogonal frequency division multiplex (OFDM) system, in which data symbols are transmitted in frequency subcarriers and timeslots (Figure 2, Col. 3 lines 30 – 39), comprising: performing a channel estimation on the basis of received pilot symbols (Cols. 4 lines 35 – 67, 5 lines 1 – 21); and performing, by a filter, a channel estimation for data symbols between pilot symbols (Cols. 4 lines 35 – 67, 5 lines 1 – 21), an estimated carrier being a wanted carrier power value at a frequency subcarrier and a timeslot of a data symbol to be channel estimated, and said interference value is an interference reference value (Cols. 4 lines 35 – 67, 5 lines 1 – 21, typical OFDM systems comprise timeslots, channel estimation takes into account various characteristics of a channel such as adjacent and co-channel interference, along with noise and background effects, the effects of said interference is quantized using the carrier to interference ratio (CIR) thus channel estimation takes into account the CIR).

Li does not teach said filter being selected from a set of filters based on the estimated carrier to interference ratio.

Khayrallah teaches said filter being selected from a set of filters based on the estimated carrier to interference ratio (Col. 7 lines 9 – 31).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the filtering method of Khayrallah in the system of Li for the purpose of enabling optimum performance of the despite the effects of adjacent channel interference.

Regarding Claims 24, 28, Li in view of Khayrallah teaches all of the claimed limitations recited in Claims 23, 27. Li further teaches a carrier to interference ratio at the frequency subcarrier and the timeslot of the data symbol to be channel estimated (Cols. 4 lines 35 – 67, 5 lines 1 – 21, typical OFDM systems comprise timeslots, channel estimation takes into account various characteristics of a channel such as adjacent and co-channel interference, along with noise and background effects, the effects of said interference is quantized using the carrier to interference ratio (CIR) thus channel estimation takes into account the CIR). Khayrallah teaches means for selecting said filter based on the estimated carrier to interference ratio (Col. 7 lines 9 – 31).

Regarding Claims 25, 29, Li in view of Khayrallah teaches all of the claimed limitations recited in Claims 24, 28. Li further teaches a frequency filter that is selected on the basis of a difference vector between frequency subcarriers adjacent to the frequency subcarrier of the data symbol to be channel estimated (Col. 2 lines 36 – 45, 2-D filter comprises a frequency filter).

Regarding Claims 31, 33, Li in view of Khayrallah teaches all of the claimed limitations recited in Claims 24, 27. Li further teaches a frequency filter that is selected on the basis of a difference vector between frequency subcarriers adjacent to the frequency subcarrier of the data symbol to be channel estimated (Col. 2 lines 36 – 45, 2-D filter comprises a frequency filter). Khayrallah teaches means for selecting said filter based on the estimated carrier to interference ratio (Col. 7 lines 9 – 31).

4.   Claims 26, 30, 32, 34 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Li (US 6,654,429) in view of Khayrallah et al. (6,047,171), as applied to Claims 24,

28 above, and further in view of Mitra et al. (5,533,063)

Regarding Claims 26, 30, Li in view of Khayrallah teaches all of the claimed

limitations recited in Claims 24, 28. Li further teaches a time filter (Col. 2 lines 36 – 45,

2-D filter comprises a time filter).

Li in view of Khayrallah does not teach means for selecting selects a filter based

on a Doppler frequency of the estimated channel.

Mitra further teaches means for selecting selects a filter based on a Doppler

frequency of the estimated channel (Col. 2 lines 39 – 40, the filter takes into account the

Doppler characteristics).

It would have been obvious to one of ordinary skill in the art at the time the

invention was made to modify the system of Li in view of Khayrallah with the filtering

technique of Mitra for the purpose of extracting a signal of interest from interfering

multipath and Doppler spread signals which does not result in an unacceptable increase

in noise as taught by Mitra.

Regarding Claims 32, 34, Li in view of Khayrallah teaches all of the claimed

limitations recited in Claims 24, 27. Khayrallah teaches means for selecting said filter

based on the estimated carrier to interference ratio (Col. 7 lines 9 – 31).

Li in view of Khayrallah does not teach means for selecting selects a filter based

on a Doppler frequency of the data symbol to be channel estimated.

Mitra further teaches means for selecting selects a filter based on a Doppler frequency of the data symbol to be channel estimated (Col. 2 lines 39 – 40, the filter takes into account the Doppler characteristics).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Li in view of Khayrallah with the filtering technique of Mitra for the purpose of extracting a signal of interest from interfering multipath and Doppler spread signals which does not result in an unacceptable increase in noise as taught by Mitra.

Conclusion

5.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RAYMOND S. DEAN whose telephone number is (571)272-7877. The examiner can normally be reached on Monday-Friday 6:00-2:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward F. Urban can be reached on 571-272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Raymond S Dean/   Raymond S. Dean
Primary Examiner, Art Unit 2618   March 24, 2008

/Edward Urban/
Supervisory Patent Examiner, Art Unit 2618